

**Scheme of Teaching and Examination for  
III Semester DIPLOMA in CHEMICAL ENGINEERING (CERAMICS ENGG) BRANCH  
THEORY**

SL. No	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME					
			Periods per Week	Periods in one Session	Hours of Exam.	Terminal Exam. (A) Marks	Final Exam. (B) Marks	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
1	Professional Mathematics	00301	6	60	3	20	80	100	26	36
2	Engineering Mechanics	00302	4	50	3	20	80	100	26	36
3	Computer Programming Through C	00303	4	50	3	20	80	100	26	36
4	Glass Technology – I	30304	4	50	3	20	80	100	26	36
5	Enamel Technology – I	30305	4	50	3	20	80	100	26	36
<b>Total :-</b>			<b>22</b>					<b>500</b>		

**PRACTICAL**

SL. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME					
			Periods per Week	Periods in one Session	Hours of Exam.	Marks Internal Exam. (A)	Marks External Exam. (B)	Total Marks (A+B)	Pass Marks Final Exam.	Pass Marks in the Subject
6	Engineering Mechanics Lab.	00306	4	50	3	10	40	50	16	21
7	Computer Programming through C	00307	6	60	3	10	40	50	16	21
8	Workshop Practice – I (Glass & enamel)	30308	6	60	6	10	40	50	16	21
9	Ceramic Engineering Lab-I	30309	4	60	3	10	40	50	16	21
<b>Total :-</b>			<b>20</b>					<b>200</b>		

**SESSIONAL**

SL. No.	SUBJECTS	SUBJECT CODE	TEACHING SCHEME		EXAMINATION SCHEME			
			Periods per Week	Periods in One Session	Marks of Internal Examiner (X)	Marks of External Examiner (Y)	Total Marks (X+Y)	Pass Marks in the Subject
10	Ceramic Engineering Workshop Practice – I (Glass & Enamel)	30310	–	–	20	30	50	25
<b>Total :-</b>							<b>50</b>	

<b>Total Periods per Week</b>	<b>42</b>	<b>Total Marks</b>	<b>750</b>
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## PROFESSIONAL MATHEMATICS

<b>Subject Code</b> <b>00301</b>	<b>Theory</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>06</b>			<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

### Rationale:

A technical diploma holder is engaged generally as first line supervisor. He forms a bridge between workers and management. He has to understand the language of the modern management and communicate with the workers in their language. This subject will help accomplishment of the task in stipulated time, develop attitude towards cost effectiveness, selection of most effective alternative methods. This course will also help the student to tackle different numerical methods and computational techniques for problem solving in research organization as a programmer.

### Objective:

The course enables students to.

- Managerial skill based on mathematical footing
- The ability to find approximate solutions and/or answers to the problems where analytical methods become more complex.
- To choose correct numerical techniques for a given problem.

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
01	GROUP –A (Numerical Methods)	<b>(20)</b>
02	GROUP-B (Statistical Techniques)	<b>(20)</b>
03	GROUP-C (Management Techniques)	<b>(20)</b>
<b>Total:</b>		<b>(60)</b>

### CONTENTS:

#### **GROUP-A (NUMERICAL METHODS) (20)**

- 01.01 Introduction to Numerical methods: Approximation and errors (Truncation & Round off).
- 01.02 Numerical solutions of non-linear and Transcendental equations: Iterative methods. Newton-Raphson's method. Bisection method and Regula-Falsi method.
- 01.03 Solution of Linear Simultaneous Equations: Gaussian Elimination method and Gauss-Jordan method.
- 01.04 Finite Difference: Backward and forward Differences. Finite Difference Interpolation Formula. Newton's Forward Difference formula and Newton's Backward Difference formula.
- 01.05 Numerical Differentiation & Integration: Newton's forward and backward differentiation formula. Trapezoidal Rule and Simpson's 1/3 rule for numerical integration.
- 01.06 Difference equations. simple problem Only

#### **GROUP-B (STATISTICAL TECHNIQUES) [20]**

- 02.01 Introduction to statistics: Measure of central tendencies: measures of dispersions: standard deviation and variance for discrete and grouped data: assumed mean and step deviation methods.
- 02.02 Theory of Probability: Random events and their types. Probability of Events. Definitions. Laws of Probability (Addition and Multiplication Laws)
- 02.03 Probability Distribution: Introduction to Arithmetic Mean and Standard Deviation of a probability distribution. Important probability distribution – Binomial distribution. Poisson's distribution & Their means and variance.

#### **GROUP-C (MANAGEMENT TECHNIQUES) [20]**

- 03.01 Linear Models
- 03.01.01 Introduction to Operations Research (O.R) Steps of O.R.
- 03.01.02 Linear Programming Problems: Formulation of a LPP. Mathematical Modelling and Solution by graphical method.
- 03.01.03 Solution by Simplex Method: Basic Feasible Solution (Degenerator and Non-degenerator)
- 03.01.04 Transportation problem: Introduction and Solution Procedure-
  - (i) Finding the initial basic feasible solution by N-W Corner Rule, Least cost method and Vogel's Approximation Method.
  - (ii) Test of optimality by **u-v** method only.
- 03.01.05 Assignment Problem: Introduction and Solution Procedure–Fundamental theory underlying Hungarian Method.
- 03.02 Network Analysis. CPM & PERT: Introduction.

- 03.02.01 Basic concepts – Activities. Nodes. Edges. Networking of a project. Various times calculations. CPM to determine the optimal project schedule.
- 03.02.02 PERT- Definition, difference between CPM & PERT. Pessimistic times, optimistic times. Most likely times of various activities.

**Books Recommended: Text Books**

- |  |  |
|--|--|
| 1. Operations Research. Sultan Chand & Sons, New Delhi, 1990     | - Kanti Swaroop. P.K Gupta and Man Mohan |
| 2. Operations Research. Sultan Chand & Sons, New Delhi, 1990     | - Heera & Gupta                          |
| 3. Operations Research. Macmillan Publishing Co. New York, 1982  | - H.A.Taha                               |
| 4. Computer based numerical algorithm, East West Press, 1975     | - E.V Krishna Murthy & S.V. Sen          |
| 5. Computer oriented numerical method, Prentice Hall India, 1980 | - V. Rajaraman                           |

## ENGINEERING MECHANICS

<b>Subject Code</b> <b>00302</b>	<b>Theory</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>04</b>	<b>00</b>	<b>00</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

### Rationale:

The subject forms an important part of Engineering curricula for developing the concepts required in the design of various structures. The subject deals with the basic concept of mechanics of body and the behaviour of material used in practice and in structures under varying load conditions. The first part of the subject deals with the applied mechanics science. Which describe the condition of body in rest or motion under the action of forces. In its preview come variety of general and specialized engineering disciplines concerned with analysis of structures and machines and the mechanism of their parts.

In the Second part, the principles of strength of materials is introduced in which the student will learn to distinguish between different types of stress and strain and also the qualitative assessment of stress and strains in material element under the action of internal forces.

### Objective:

Knowledge Workers will be able to:

- Analyze and understand the physical behaviour of members of engineering structures.
- Acquire knowledge of various elements of structures.
- Utilise the basic principles.
- Develop skill to tackle field problem.
- Solve the problems by the application of basic principles.
- Judge the suitability of materials in design process.

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
<b><u>PART-A</u></b>		
01	Introduction	(02)
02	Vector Methods	(02)
03	Introduction to system of forces and equilibrium	(06)
04	Friction	(04)
05	Kinematics and kinetics of a particle	(03)
06	Kinematics and kinetics of rigid body	(02)
07	Impulse and Momentum	(02)
08	Work, Energy and Power	(04)
<b>Total :</b>		<b>(25)</b>
<b><u>PART-B</u></b>		
01	Simple stress and strains	(07)
02	Elastic constants	(03)
03	Center of Gravity (Centroid)	(02)
04	Moment of Inertia	(05)
05	Shearing force and bending moments	(08)
<b>Total :</b>		<b>(50)</b>

### CONTENTS:

#### **PART-A**

**TOPIC: 01 – INTRODUCTION:** [02]

Idealisation of mechanics; Concept of rigid body; External forces (Body forces & surface forces) Law of Mechanics.

**TOPIC: 02 VECTOR METHODS:** [02]

Equality and equivalence of vectors; Free and Bound vector; Moment of a force about a point and a line; Couple and moment of a couple.

**TOPIC: 03 – INTRODUCTION TO SYSTEM OF FORCES AND EQUILIBRIUM:** [06]

Statically equivalent force system; simplest equivalent of a system of forces; force analysis, free body diagram, equation of equilibrium.

<b><u>TOPIC: 04 – FRICTION:</u></b>	[04]
Basic Concept of different Friction (Static, Dynamic, Sliding, Rolling, Fluid).	
<b><u>TOPIC: 05 – KINEMATICS AND KINETICS OF A PARTICLE:</u></b>	[03]
Rectilinear and curvilinear translations; normal and tangential component of acceleration.	
<b><u>TOPIC:06 – KINEMATICS AND KINETICS OF RIGID BODY:</u></b>	[02]
Simple concept of Angular Velocity and angular acceleration. Effective forces on a rigid body. D’ Alembert’s principle.	
<b><u>TOPIC:07 – IMPULSE AND MOMENTUM:</u></b>	[02]
Linear impulse and linear momentum, angular impulse and angular momentum, definitions only;	
<b><u>TOPIC: 08 – WORK, ENERGY AND POWER:</u></b>	[04]
Work done by forces and couples, potential and kinetic energy, work-energy; conservation of energy; concept of power and efficiency.	

**PART-B**

<b><u>TOPIC: 01 – SIMPLE STRESSES &amp; STRAIN:</u></b>	[07]
01.01 Definition of various terms and their units (S.I. Units)	
01.02 Stress and strain due to axial load and transverse load relation between stress and strain. Hook’s law. Studies of stress strain curve. Factor of safety & working stress. Concepts of isotropic materials.	
01.03 Stress & strain in simple section & composite bar. Stress & strain due to temperature variation.	
01.04 Shrinking on hoop’s stresses.	
<b><u>TOPIC: 02 – ELASTIC STRESS &amp; STRAIN:</u></b>	[03]
02.01 Linear strain and lateral strain, poisson’s ratio, volumetric strain	
02.02 Change in volume due to axial, biaxial & triaxial loading. Bulk modulus.	
02.03 Shear stress and strain, modulus of rigidity.	
02.04 Simple shear. Complementary shear stress.	
02.05 Various Relations among modulus of elasticity, modulus of rigidity & bulk modulus.	
<b><u>TOPIC: 03 – CENTER OF GRAVITY (CENTROID):</u></b>	[02]
03.01 Definition of center of gravity & centroid.	
03.02 Determination of C.G of various sections symmetrical and unsymmetrical sections.	
03.03 Determination of C.G. of perforated sections.	
<b><u>TOPIC: 04 – MOMENT OF INERTIA:</u></b>	[05]
04.01 Definition of M.I.; radius of gyration, second moment of area.	
04.02 Parallel axis theorem & perpendicular axis theorem.	
04.03 Derivation of M.I. of regular area-rectangular, triangular circular about centroidal axis.	
04.04 M.I. of built up section, symmetrical and unsymmetrical about centroidal axis, modulus of sections.	
<b><u>TOPIC: 05 – SHEARING FORCE &amp; BENDING MOMENT:</u></b>	[08]
05.01 Types of beams and types of supports, types of loading.	
05.02 Concept and definitions of shear force and bending moment, sign convention.	
05.03 Shear force and bending moment diagrams for cantilever, simply supported beam, over hanging beam for various types of loading & couples, point of contraflexure.	
05.04 Relation between B.M, S.F. and rate of loading.	

**Books Recommended:**

**Text Books**

1. Strength of Materials	- R.S. Khurmi
2. Mechanics of Structure	- S.B. Junarkar
3. Strength of Materials	- Ramamrutham
4. Theory of Structure	- Vazirini & Ratwani
5. Strength of Materials & Mechanics of Structure.	- Punamia
6. Teaching plans of Strength of Material	- T.T.T.I. Madras
7. द्रव्य सामर्थ्य	- गुरुचरण सिंह
8. Engineering Mechanics	- I.H. Shames
9. Engineering Mechanics	- Beer & Johnson
10. Strength of material	- S.K. Singh

# COMPUTER PROGRAMMING THROUGH C

<b>Subject Code</b>  <b>00303</b>	<b>Theory</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>		<b>: 100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>		<b>: 80</b>
	<b>04</b>	<b>00</b>	<b>00</b>	<b>Internal Exam.</b>		<b>: 20</b>

**Rationale:**

Computers play a vital role in present day life, more so, in the professional life of technician engineers. In order to enable the students use the computers effectively in problem solving, this course offers the modern programming language C along with exposition to various engineering applications of computers.

**Objective:**

The objectives of this course are to make the students able to:

- Develop efficient algorithms for solving a problem.
- Use the various constructs of a programming language viz. conditional, iteration and recursion.
- Implement the algorithms in “C” language.
- Use simple data structures like arrays, stacks and linked list solving problems.
- Handling File in “C”.

<u>S.No.</u>	<u>Topics</u>	<u>Periods</u>
01	Introduction to Programming	(03)
02	Algorithm for Problem Solving	(08)
03	Introduction to ‘C’ Language	(08)
04	Condition and Loops	(07)
05	Arrays	(07)
06	Functions	(07)
07	Structures and Unions	(04)
08	Pointers	(06)
<b>Total :</b>		<b>(50)</b>

**CONTENTS:**

**TOPIC: 01 – INTRODUCTION TO PROGRAMMING: [03]**

The Basic Model of Computation, Algorithms, Flow-charts, Programming Languages, Compilation, Linking and Loading, Testing and Debugging, Documentation. Programming Style-Names, Documentation & Format, Refinement & Modularity.

**TOPIC: 02 – ALGORITHM FOR PROBLEM SOLVING: [08]**

Exchanging values of two variables, summation of a set of numbers. Reversing digits of an integer, GCD (Greatest Common Division) of two numbers. Test whether a number is prime. Organize numbers in ascending order. Find square root of a number, factorial computation, Fibonacci sequence. Compute sine Series. Check whether a given number is Palindrome or not. Find Square root of a quadratic equation. multiplication of two matrices,

**TOPIC: 03 – INTRODUCTION TO ‘C’ LANGUAGE: [08]**

- 03.01 Character set, Variable and Identifiers, Built-in Data Types, Variable Definition, Declaration, C Key Words-Rules & Guidelines for Naming Variables.
- 03.02 Arithmetic operators and Expressions, Constants and Literals, Precedence & Order of Evaluation.
- 03.03 Simple assignment statement. Basic input/output statement.
- 03.04 Simple ‘C’ programs of the given algorithms

**TOPIC: 04 – CONDITIONAL STATEMENTS AND LOOPS: [07]**

- 04.01 Decision making within a program
- 04.02 Conditions, Relational Operators, Logical Perator.
- 04.03 If statement, it-else statement.
- 04.04 Loop statements
- 04.05 Break, Continue, Switch

**TOPIC: 05 – ARRAYS: [07]**

What is an Array?, Declaring an Array, Initializing an Array. One dimensional arrays: Array manipulation: Searching, Insertion, Deletion of an element from an array; Finding the largest/smallest element in array; Two dimensional arrays, Addition/Multiplication of two matrices.

**TOPIC: 06 – FUNCTIONS:****[07]**

Top-down approach of problem solving. Modular programming and functions, Definition of Functions Recursion, Standard Library of C functions, Prototype of a function: Formal parameter list, Return Type, Function call, Passing arguments to a Function: call by reference; call by value.

**TOPIC: 07 – STRUCTURES AND UNIONS:****[04]**

Basic of Structures, Structures variables, initialization, structure assignment, Structures and arrays: arrays of structures,

**TOPIC: 08 – POINTERS:****[06]**

Concept of Pointers, Address operators, pointer type declaration, pointer assignment, pointer initialization pointer arithmetic.

**Book Recommended:**

1. Programming with C. Second Edition. Tata McGraw-Hill, 2000 - Byron Gottfried
2. How to solve by Computer, Seventh Edition, 2001, Prentice hall of India. - R.G. Dromey
3. Programming with ANSI-C, First Edition, 1996, Tata McGraw hill. - E. Balaguruswami
4. Programming with ANSI & Turbo C. First Edition, Pearson Education. - A. Kamthane
5. Programming with C. First Edition, 1997, Tara McGraw hill. - Venugopla and Prasad
6. The C Programming Language, Second Edition, 2001, Prentice Hall of India. - B. W. Kernighan & D.M. Ritchie
7. Programming in C, Vikash Publishing House Pvt. Ltd., Jungpura, New Delhi. - R. Subburaj
8. Programming with C Language, Tara McGraw Hill, New Delhi. - C. Balagurswami
9. Elements of C, Khanna Publishers, Delhi. - M. H. Lewin
10. Programming in C. - Stephen G. Kochan
11. Programming in C, khanna Publishers, Delhi. - B. P. Mahapatra
12. Let us C, BPB Publication, New Delhi. - Yashwant kanetkar
13. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. - Kris A. Jamsa
14. The Art of C Programming, Narosa Publishing House, New Delhi. - Jones, Robin & Stewart
15. Problem Solving and Programming. Prentice Hall International. - A.C. Kenneth
16. C made easy, McGraw Hill Book Company, 1987. - H. Schildt
17. Software Engineering, McGraw Hill, 1992. - R.S. Pressman
18. Pointers in C, BPB publication, New Delhi. - Yashwant Kanetkar

## GLASS TECHNOLOGY - I

<b>Subject Code</b> <b>30304</b>	<b>Theory</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>04</b>	<b>00</b>	<b>00</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

S.No.	Topics	Periods
01	Introduction and Classification	
02	Raw Materials	
03	Colourants of Glass	
04	Principles of Glass Making	
05	Glass Furnaces	

### CONTENTS:

#### TOPIC: 01 – INTRODUCTION AND CLASSIFICATIONS:

Introduction of glass classification of glass such as Soda lime glass, Potash lime glass, Potash lead glass, Borosilicate glass, Phosphate Silicate glass, white and coloured glass, safety glass, compound glass, sandwich glass, Triplex or threeply glass, strained glass.

#### TOPIC: 02 – RAW MATERIALS:

Raw material such as Silica, Boric Oxide, Phosphoric Oxide, Sodium Oxide, Potassium Oxide, Lithium Oxide, Calcium Oxide, Barium Oxide, Lead Oxide, Aluminium Oxide, Titanium Oxide, Zinc Oxide, Magnesium Oxide – their properties and origin.

#### TOPIC: 03 – COLOURANTS OF GLASS:

Chromium, Vanadium, Nickel, Cobalt, Copper, Magnese, Iron, Sulphur, Carbon, Silver, Gold, Selenium, Decolourisation of glass.

#### TOPIC: 04 – PRINCIPLES OF GLASS MAKING:

Storage and mixing of raw materials, batch calculation with different type of problem solution, cullet, fluxes, oxidising and reducing agents, fining and annealing of glass.

#### TOPIC: 05 – GLASS FURNACES :

Study of common types of furnace used in glass-melting. Glass Tank furnace, Pot furnace, Annealing Lehrs.

### Books Recommended:

1 Hand Book of Glass Technology	- Dr. R. Charan
2 Modern Glass Practice	- S.R. Scholes
3 Hand Book of Glass Manufacture Vol – I and II	- F.V. Tooley
4 Glass Melting Tank Furnace	- R. Gunther
5 Coloured Glasses	- W.A. Weyl



## ENAMEL TECHNOLOGY - I

<b>Subject Code</b> <b>30305</b>	<b>Theory</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>100</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>80</b>
	<b>04</b>	<b>00</b>	<b>00</b>	<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

### CONTENTS:

#### **TOPIC: 01**

Introduction

#### **TOPIC: 02**

Raw Materials: Availability of raw materials, physical and chemical properties of raw materials.

#### **TOPIC: 03**

Preparation – Frit Making, Milling and mill additions, electrolytes

#### **TOPIC: 04**

Preparation and control of slip

#### **TOPIC: 05**

Preparation of metal surface for enamelling – steel, cast iron.

#### **TOPIC: 06**

Composition of enamel

#### **TOPIC: 07**

Application of slip

#### **TOPIC: 08**

Enamelling Furnaces

#### **TOPIC: 09**

Firing

#### **TOPIC: 10**

Common defect, their causes and remedies – pinhole, peeling, cracks, chipping, fish scaling, blistering, hair lining, jumping-off, reboiling, rusting, speckling, tearing, warping.

### **Books Recommended:**

- |   |                      |               |
|---|----------------------|---------------|
| 1 | Porcelain Enamels    | - A.I. Andrew |
| 2 | Technology of Enamel | - V.V. Vargin |

## ENGINEERING MECHANICS Lab.

<b>Subject Code</b>  <b>00306</b>	<b>Practical</b>			<b>No of Period in one session : 50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>40</b>
	<b>04</b>			<b>Internal Exam.</b>	<b>:</b>	<b>10</b>

### Rationale & Objectives:

The Engineering Mechanics Laboratory is a subject which will help technician to understand the application of theory that he has studied in practice by performing experiments and verifying results.

Besides the above the objective of the curriculum with effective skill will be developed in them to observe experimental data, and to analyses the results.

These topics of this curriculum will certainly build their confidence in performing the utilization of principle of mechanics in Civil Engineering works.

### CONTENTS:

Eight experiments to be performed in the laboratory:

1. Determination of elongation of wire under external load.
2. Tensile Test on mild steel specimen.
3. Tensile Test on high tensile specimen.
4. Compression Test on metal.
5. Compression Test on bricks.
6. Determination of Young's Modulus of Elasticity of wire.
7. Determination of reaction at the support of beam.
8. Determination of bending moment of a simply supported beam.
9. Determination of reaction at the support of roof truss.
10. Determination of deflection of beams.
11. Determination of moment of inertia of fly wheel.
12. Determination of bending moment of a over hanging beam.
13. Verification of Polygon Law of forces.
14. Verification of Triangle Law of forces.
15. To find moment of inertia of fly wheel.
16. Compression Test on metal.
17. Tensile Test on M.S.specimen.
18. Determination of co-efficient of friction on inclined plane.

### Books Recommended:

#### Text Books

- |  |                   |
|--|-------------------|
| 1. अभियांत्रिक यंत्रिकी                            | . जे०के० कपूर     |
| 2. Strength of Materials                           | - Bininder Singh  |
| 3. Mechanics of Structure, Vol. 1                  | - S.B. Junarkar   |
| 4. Strength of Materials                           | - R.S. Khurmi     |
| 5. Engineering Mechanics and Strength of Materials | - I.B. Prasad     |
| 6. Teaching plans of Strength of Material          | - T.T.T.I. Madras |

# COMPUTER PROGRAMMING THROUGH 'C'

<b>Subject Code</b> <b>00307</b>	<b>Practical</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>40</b>
	<b>06</b>	<b>00</b>	<b>03</b>	<b>Internal Exam.</b>	<b>:</b>	<b>10</b>

## CONTENTS:

### List of Practicals:

1. Programming exercise on executing a C program.
2. Programming exercise on editing C program.
3. Programming exercise on defining variables and assigning values to variable.
4. Programming exercise on arithmetic and relational operations.
5. Programming exercise on arithmetic expressions and their evaluation
6. Programming on infix, postfix, transformation using stack.
7. Programs on array implementation.

### Books Recommended:

- |  |   |  |
|--|---|--|
| 1. How to solve it by Computer, Prentice Hall of India, 1992.                | - | R.G. Dromey.                           |
| 2. The C Programming Language, Prentice Hall of India, 1989.                 |   | - B.W. Kernighan & D.M. Ritchie.       |
| 3. The Spirit of C Programming, Jaico Publishing House, New Delhi, 1987.     |   | - Cooper, Mullish                      |
| 4. Application Programming in C. Macmillain International editions, 1990.    |   | - Richa'd Johnson-Baugh & Martin Kalin |
| 5. The Art of C Programming, Narosa Publishing House, New Delhi.             |   | - Jones, Robin & Stewart               |
| 6. Problem Solving and Programming. Prentice Hall International.             |   | - A.C. Kenneth.                        |
| 7. C made easy, McGraw Hill Book Company, 1987.                              |   | - H. Schildt                           |
| 8. Software Engineering, McGraw Hill, 1992.                                  |   | - R.S. Pressman                        |
| 9. Programming in C, Vikas Publishing House Pvt. Ltd., Jungpura, New Delhi   |   | - R. Subburaj                          |
| 10. Programming with C language, Tata McGraw Hill, New Delhi.                |   | - C. Balaguruswami                     |
| 11. Elements of C, Khanna Publishers. Delhi                                  |   | - M. H. Lewin                          |
| 12. Programming in C   |   | - Stephan G. Kochan.                   |
| 13. Programming in C, Khanna Publishers. New Delhi                           |   | - B.P. Mahapatra                       |
| 14. Let us C, BPB Publication. New Delhi                                     |   | - Yashwant Kanetkar                    |
| 15. Programming in C, Galgotia Publications Pvt. Ltd. Dariyaganj, New Delhi. |   | - Kris A. Jamsa                        |

## WORKSHOP PRACTICE – 1 (GLASS AND ENAMEL)

<b>Subject Code</b> <b>30308</b>	<b>Practical</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>40</b>
	<b>06</b>		<b>03</b>	<b>Internal Exam.</b>	<b>:</b>	<b>10</b>

## CONTENTS:

### GLASS

#### TOPIC: 01

Preparation of raw material

**TOPIC: 02**

Batch formation

**TOPIC: 03**

Mixing of the batch ingredients.

**TOPIC: 04**

Melting of simple glass

**TOPIC: 05**

- Blowing of glass shapes:
- Glowing
- Pressing

**TOPIC: 06**

Decoration of Glass

**ENAMEL****TOPIC: 01**

- Metal surface preparation:
- Cleaning
- Pickling
- Nickel Dip
- Neutralisation

**TOPIC: 02**

Formation of frits

**TOPIC: 03**

Melting of frits

**TOPIC: 04**

Compounding of recipe of enamel slip with frit

**TOPIC: 05**

- Application of enamel:
- Dipping
- Spraying
- Stencil Making
- Screen-Printing
- Hand Printing

**TOPIC: 06**

Firing of Enamel Wares

## CERAMIC ENGINEERING LAB. - I

<b>Subject Code 30309</b>	<b>Practical</b>			<b>No of Period in one session : 60</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>40</b>
	<b>04</b>			<b>Internal Exam.</b>	<b>:</b>	<b>10</b>

### CONTENTS:

1. To study the physical properties of clay
2. Determination of water content in clay
3. Determination of shrinkage of clay
4. Determination of Plasticity of clay
5. Determination of Bulk density of Refractory brick
6. Determination of True Specific Gravity of Refractory brick
7. Determination of Apparent Porosity of Refractory brick
8. Seive Analysis of Glass sand
9. Determination of Density of glass by Float and Sink method
10. Determination of thermal Endurance of glass

## WORKSHOP PRACTICE – 1 (GLASS AND ENAMEL)

<b>Subject Code</b> <b>30310</b>	<b>Sessional</b>			<b>No of Period in one session :50</b>		
	<b>No. of Periods Per Week</b>			<b>Full Marks</b>	<b>:</b>	<b>50</b>
	<b>L</b>	<b>T</b>	<b>P/S</b>	<b>Annual Exam.</b>	<b>:</b>	<b>30</b>
				<b>Internal Exam.</b>	<b>:</b>	<b>20</b>

### CONTENTS:

#### GLASS

##### **TOPIC: 01**

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##### **TOPIC: 02**

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##### **TOPIC: 03**

Mixing of the batch ingredients.

##### **TOPIC: 04**

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##### **TOPIC: 05**

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- Glowing
- Pressing

##### **TOPIC: 06**

Decoration of Glass

#### ENAMEL

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- Pickling
- Nickel Dip
- Neutralisation

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##### **TOPIC: 03**

Melting of frits

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##### **TOPIC: 05**

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- Dipping
- Spraying
- Stencil Making
- Screen-Printing
- Hand Printing

##### **TOPIC: 06**

Firing of Enamel Wares